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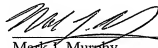
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in the following listed application(s) or patent(s) for which the issue fee has been paid.

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(12) **United States Patent**  
**Kumaki et al.**(10) **Patent No.:** **US 7,964,864 B2**  
(45) **Date of Patent:** **Jun. 21, 2011**(54) **LIGHT-EMITTING ELEMENT AND  
LIGHT-EMITTING DEVICE**(75) Inventors: **Daisuke Kumaki, Nigata (JP); Satoshi  
Seo, Kanagawa (JP)**(73) Assignee: **Semiconductor Energy Laboratory  
Co., Ltd. (JP)**(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 64 days.(21) Appl. No.: **10/573,929**(22) PCT Filed: **Sep. 27, 2005**(86) PCT No.: **PCT/JP2005/018243**§ 371 (c)(1),  
(2), (4) Date: **Mar. 30, 2006**(87) PCT Pub. No.: **WO2006/035973**PCT Pub. Date: **Apr. 6, 2006**(65) **Prior Publication Data**  
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**H01L 31/00 (2006.01)**(52) U.S. CL ..... **257/13; 257/40; 257/E39.007**(58) **Field of Classification Search** ..... **257/40,**  
**257/13, E39.007**

See application file for complete search history.

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(57)

**ABSTRACT**

It is an object of the present invention to provide a light-emitting element having a layer containing a light-emitting material and a transparent conductive film between a pair of electrodes, in which electric erosion of the transparent conductive film and metal can be prevented, and also to provide a light-emitting device using the light-emitting element. According to one feature of the invention, a light-emitting element includes a first layer 102 containing a light-emitting material, a second layer 103 containing a material having a donor level, a third layer 104 including a transparent conductive film, and a fourth layer 105 containing a hole-transporting medium between a first electrode 101 and a second electrode 106, in which the first layer 102, the second layer 103, the third layer 104, the fourth layer 105, and the second electrode 106 are provided sequentially, in which the second electrode 106 has a layer containing metal.

**18 Claims, 10 Drawing Sheets**